

Response After Final
Application No. 10/615,193
Attorney Docket No. 000138A

AMENDMENTS TO THE SPECIFICATION:

Please amend the specification as follows:

Amend the paragraph beginning on page 12, line 12 to read as follows:

To achieve the above object, according to the present invention, there is provided a process for heating a thixocast Fe-based alloy material having a chilled structure into a semi-molten state in which solid and liquid phases coexist, wherein the average rate H_R of heating from a normal temperature to a point A_1 in an Fe-C based equilibrium diagram is set in a range of $0.5 \text{ }^{\circ}\text{C/sec} \leq H_R \leq 6.0 \text{ }^{\circ}\text{C/sec}$, and the maximum temperature gradient T_G of the inside of the Fe-based alloy material per unit distance is set at $T_G = 7 \text{ }^{\circ}\text{C/mm}$.

Amend the paragraph beginning on page 36, line 16 to read as follows:

The Fe-based alloy material 50 was heated from a normal temperature to $740 \text{ }^{\circ}\text{C}$ (the point A_1) at the average heating rate H_R set at $2.9 \text{ }^{\circ}\text{C/sec}$, $4.7 \text{ }^{\circ}\text{C/sec}$, $6.4 \text{ }^{\circ}\text{C/sec}$ and $7.2 \text{ }^{\circ}\text{C/sec}$. The relationship between the average temperature of the material 50 and the difference ΔT between the temperatures at the casting reference-temperature point P and the highest-temperature point Q was examined, thereby providing a result shown in Fig. 22. The term "average temperature" as used herein means an average value $(T_E + T_F)/2$ of temperatures T_E and T_F at the points E and F.

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The maximum temperature gradient T_G was calculated from a maximum value of the temperature differences ΔT and the distance $d \approx 34$ mm between both the points E and F. The relationship between the maximum temperature gradient T_G and the average heating temperature H_R was examined, thereby providing a result shown in Fig. 23. When the average heating temperature H_R was set at 4.7°C/sec in this heating test, cracks were not generated in the Fe-based alloy material, but when the average heating rate H_R was set at 6. 4°C/sec, cracks were generated in the Fe-based alloy material.